Section IV

Maintaining Your Building's Energy-Efficient Edge

Many energy-saving measures can be incorporated into an existing building to improve its overall efficiency greatly. But making a building energy efficient is not a one-shot deal; you can't "fix" a building and then ignore it. The key to energy efficiency lies in tracking your energy bills carefully to monitor changes and making a commitment to a regular maintenance program.

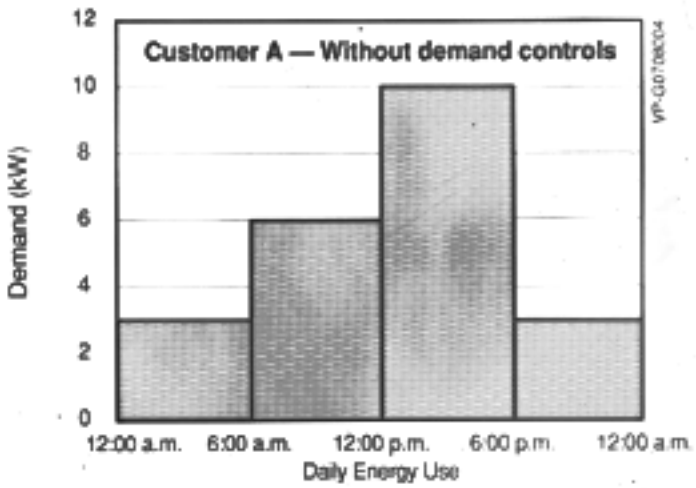
Understanding Rate Structure

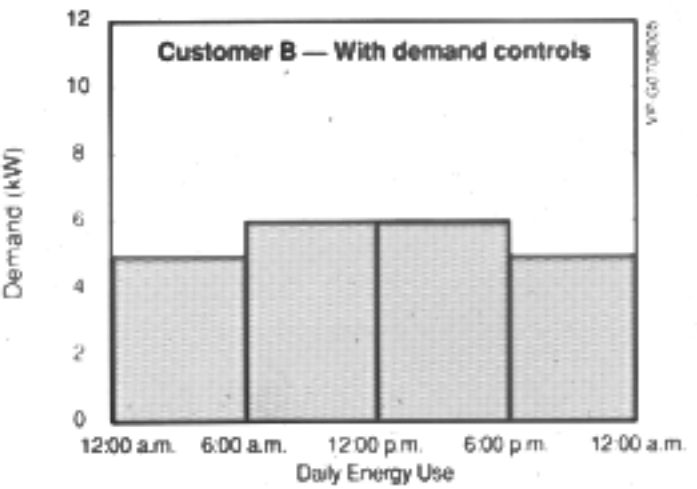
To understand how your utility charges you for energy use, you need to understand how rate structure works. Utilities generally offer residential and commercial rate structures to their customers. Depending on the size and services offered in your building, it could be classified as either residential or commercial.

If you're on a residential schedule, you generally pay per unit of energy used. If you are on a commercial rate structure, you may pay for electricity according to the quantity of energy (in kilowatt-hours) you use *and* the peak rate (in kilowatts) at which you use it, which is known as demand. The cost for demand is based on the highest rate of use in a given billing period.

The following example shows the significant savings you can realize by reducing your demand during peak-use periods. Customer A and customer B both use the same amount of energy, yet customer B keeps his demand or peak rate of use

Rate Structure





lower than customer A's. As a result, customer B pays approximately 18% less per month for electricity (based on a cost of $9.75 per kilowatt and $0.028 per kilowatt-hour).

Depending on where you live, the amount you pay for demand can be more than half your total bill. You can buy controls that limit electric demand, called "demand limiters" or "interlocks," to prevent your demand from exceeding predetermined levels by shutting off appliances in a predefined sequence. To find out more about how your utility charges for demand, call your utility representative.

Mechanical System Tips

- Keep your thermostat setting as low as practical in the winter and as high as practical in the summer.
- In warm weather, prevent the sun's heat from entering through the windows to keep your building from overheating.
- Close the door and turn the heat down or off in unoccupied areas.
- Cover the evaporative cooler or air conditioner during the heating season. Have annual maintenance checks.

Energy-Conscious Operation and Maintenance

Building Shell Tips

- Keep windows closed when you're mechanically heating or cooling the building.
- Close blinds and drapes at night when you're heating the building. Open them on sunny winter days to let the sun in.
- If your windows are frequently broken by vandals, consider replacing the glass with a plastic material. One trade name is Lexan. This type of plastic is stronger than single-pane glass and is transparent. It is more expensive than replacement glass, but it won't break.

- Be sure your furnace is operating as efficiently as possible through proper maintenance, such as changing the filters.
- Repair leaky air-conditioner, furnace, or return air ducts with duct tape.

Hot Water Tips

- Repair leaks and drips that waste water. Replace washers and packings as required. For example, 30 drops per minute of water electrically heated to 120°F from one faucet costs $15 per year.
- Check and repair the insulation on your water heater tank and pipes.
- Reduce the temperature on your water heater from the standard setting of 140°F to 120°F. Reducing the temperature setting 10 degrees will save more than 6% a year in water-heating energy. Dishwashing requires a temperature of 140°F; however, many dishwashers have electric booster heaters.

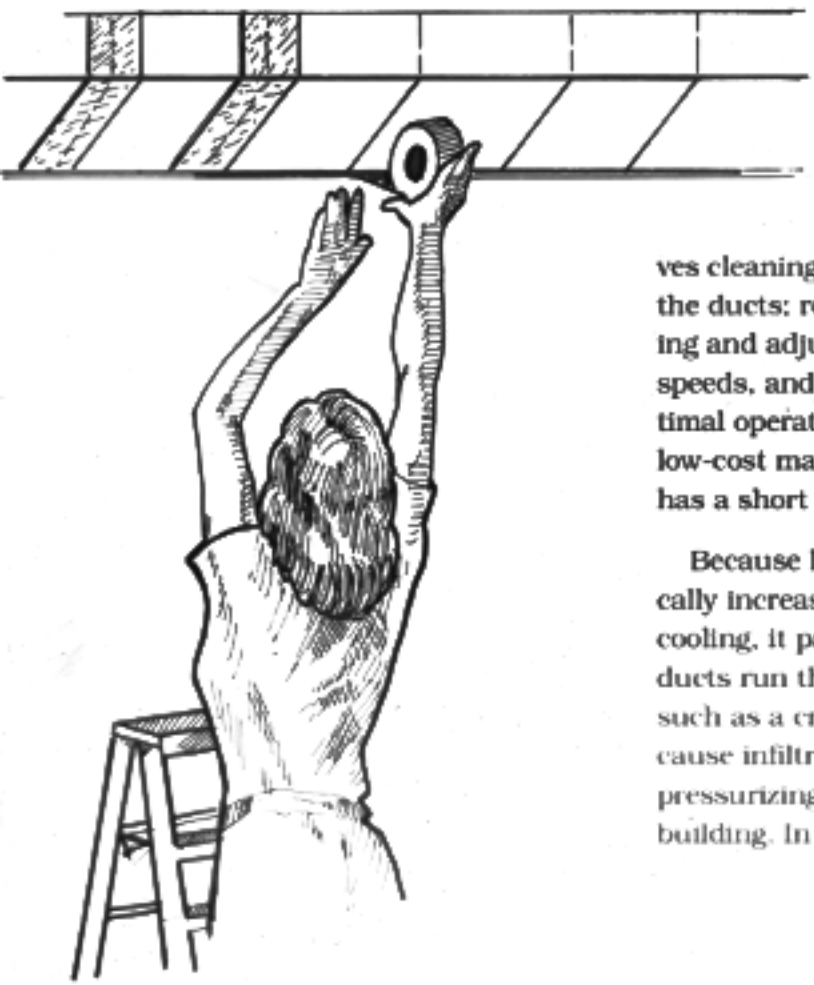
- Reduce your overall water usage—and your costs for water heating—by installing water-saving devices such as low-flow shower- heads. A low-flow showerhead costs $10–$20 and can pay for itself in less than a year.
- Encourage your staff and residents to refrain from running the hot water in the kitchen or bath needlessly. Use cold water, rather than hot, whenever possible.

Lighting Tips

- Use one large bulb instead of several small ones in areas where you need bright light.
- Have staff and residents turn off lights whenever they leave a room or area.
- Remove excess fluorescent tubes from fixtures in overlit areas. For example, with energy-efficient fluorescents, you can remove two of the four tubes in each fixture. Remember to disconnect the ballast (the fixture used to start and operate the lamp) when you remove fluorescent tubes.
- Keep all lamps and lighting fixtures clean. Dirt absorbs light and shortens bulb life.
- Use light colors for walls and draperies—they reflect light and thus reduce the amount of artificial light required.

Appliance Tips

- Don't leave your appliances running when they're not being used.
- Keep appliances in good working order so they'll last longer, work more efficiently, and use less energy.
- Fill, but do not overcrowd, your refrigerator/freezers for best energy performance.
- Check door gaskets to be sure they seal tightly, and replace them if they're worn or broken. If you can slip a dollar bill easily between the gaskets of a closed door, they're too loose.
- When you use the clothes dryer, separate loads into fast- and slow-drying items.
- Install gas dryers if possible; they cost about one-third as much to operate as electric dryers.



Maintenance Is the Bottom Line

Setting up a maintenance program is a critical part of any building operation. Regular maintenance checks on furnaces and other equipment are important to such a program. Not only do regular tune-ups cut heating costs, but they also increase the lifetime of the system and reduce breakdowns, maintenance costs, and the amount of smoke, carbon monoxide, and other pollutants.

A furnace tune-up involves cleaning the furnace and vacuuming the ducts; replacing the filters; and checking and adjusting the cycling time, fan speeds, and combustion efficiency for optimal operation. A furnace tune-up is a low-cost maintenance item that generally has a short payback.

Because leaks in ductwork can dramatically increase energy use for heating and cooling, it pays to repair them. When ducts run through unconditioned space, such as a crawlspace or basement, leaks cause infiltration heat losses or gains by pressurizing or depressurizing the entire building. In centrally cooled homes,

repairing leaks can reduce cooling energy usage by 18% with a payback of less than two years.

Here is a sample of the types of items to consider including in the maintenance checklist for your building:

Activity	How Often?
Heating System	
Furnace:	
• Check and replace clogged filters	1 year
• Tune-up for gas-fired furnace	2-3 years
• Tune-up for oil-fired furnace	2 years
Boilers:	
• Check all controls	6 months
• Clean and adjust burners, clean fire side of heat exchangers, and lubricate pumps	1 year
• Check efficiency and tune, clean water side of heat exchanger with chemicals	2-3 years
Programmable thermostats:	
• Check to make sure they are operating as programmed	After programming
• Check to make sure they haven't lost information	After power outages
Ductwork:	
• Clean fins on baseboard radiators, dust and and vacuum air registers	1 year
• Check for leaks	3 years
Water Heating	
Flush hot water tank, check pressure-relief valve	1 year
Check and repair pipe and faucet leaks	1 month
Ventilation and Air Conditioning	
Clean and service all fan motors and air-conditioning equipment	3 years
Lighting	
Clean light fixtures	1 year
Appliances	
Clean condenser coils on refrigeration equipment	1 year